

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 1-3, 5-8, and 11-13 remain in the application. Claims 4 and 9-10 have been canceled. Claims 12-13 have been withdrawn.

In item 7 on pages 2-4 of the above-mentioned Office action, claims 1-2, 5, and 8 have been rejected as being unpatentable over Schmidt et al. (US Pat. No. 5,721,044) in view of Miyahara (US Pat. No. 5,629,559) under 35 U.S.C. § 103(a). In item 8 on pages 4-5 of the above-mentioned Office action, claims 1 and 9 have been rejected as being unpatentable over Stoisiak et al. (US Pat. No. 6,310,401) in view of Miyahara under 35 U.S.C. § 103(a). In item 9 on pages 6-7 of the above-mentioned Office action, claims 10 and 11 have been rejected as being unpatentable over Stoisiak et al. in view of Miyahara and further in view of Crowley et al. (US Pat. No. 6,521,982) under 35 U.S.C. § 103(a). In item 10 on pages 7-8 of the above-mentioned Office action, claims 1-3 and 5-7 have been rejected as being unpatentable over Choi (US Pat. No. 6,404,065) in view of Miyahara under 35 U.S.C. § 103(a).

The rejections have been noted and claim 1 has been amended in an effort to even more clearly define the invention of the

instant application. More specifically, the features of claims 9 and 10 have been added to claim 1.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, *inter alia*:

a substrate body having an insulating ceramic layer with a top side, and a metal layer fixedly joined to said top side of said insulating ceramic layer, said substrate body being one of a direct copper bonded (DCB) substrate and an active metallic brazed (AMB) substrate;

at least one connection conductor laser-welded to said metal layer, said connection conductor having a foot being bent at right angles, said foot having at least one slot formed therein.

As admitted by the Examiner, Schmidt et al., Stoisiak et al., and Choi "fail to teach a connection conductor laser-welded to the metal layer." However, the Examiner has then stated that Miyahara teaches conventional welding, laser welding, and soldering, etc. used in connection with lead frames and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the conventional laser welding method as mentioned by Miyahara for the connection between conductor and metal layer of Schmidt et al., Stoisiak et al., or Choi.

Applicants believe that there is no direct connection between Schmidt et al., Stoisiak et al., or Choi and Miyahara and a person skilled in the art would not have been able to combine the teachings of the references with one another at the time of the invention of the instant application without any motivation to do so.

None of the references shows or suggests direct laser welding on the surface of a DCB or AMB substrate. An important aspect of the invention of the instant application is that until the time of the invention, laser welding directly on the surface of a DCB or AMB substrate was considered impractical because the metallization layer is so thin that it would be melted through by the laser welding. The invention of the instant application ignores this prejudice and teaches the application of laser welding in connection with a DCB or AMB substrate.

Applicants also do not agree with the Examiner's assessment that the limitation "laser-welded" will not establish the patentability of the final product, or in other words that it is not evident from the product whether the connection was effected through laser welding or conventional welding. Laser welding differs from other welding methods with regard to the welding point size, the missing slagging and the bead formation. A person skilled in the art can differentiate the

laser welding from other welding methods at the final product based on the above-mentioned features.

Although Applicants believe that none of the references, whether taken alone or in any combination, either show or suggest direct laser welding on the surface of a DCB or AMB substrate, Applicants amended claim 1 by incorporating the features of original claims 9-10 in order to facilitate the prosecution procedure.

The slot in the bent foot according to original claim 10 serves during laser welding, especially at the early stage, to control the laser light and thus to moderate the beginning energy of the laser so that the energy guided in the substrate rises with a flat slope. Otherwise, the energy would rise suddenly when the laser is turned on, which means that the energy would rise with a very steep slope and thus leads to a "blowing out" of the metallization. The reason therefore is the low beginning absorption of copper, which rises dramatically and erratically with the formation of the welding fused metal. There is a danger of melting through of the thin metallization and damaging of the ceramic layer under the thin metallization having a high absorption degree. Damage to the insulation ceramic accounts for more than 90% of the insulation failure, namely a break down of the module during

manufacture. A further rise of the laser energy is necessary due to the application of certain copper alloys so that the danger to the ceramic layer increases even further. Due to the dispersion of the laser light through the slot as shown in Fig. 3, the rise can be slowed down and thus the laser can be shut off in time before reaching the critical energy.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since all of the dependent claims are ultimately dependent on claim 1, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-3, 5-8, and 11 are solicited.

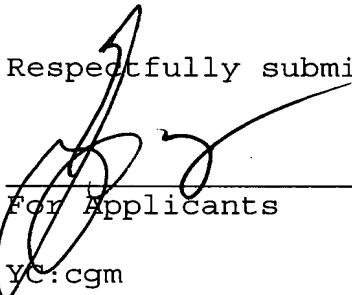
In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate a telephone call so that, if possible, patentable language can be worked out. In the alternative, the entry of the amendment is requested as it is believed to place the application in better condition for appeal, without requiring extension of the field of search. IT IS NOTED THAT THE ADDITION OF THE SUBJECT MATTER

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OF CLAIMS 9 AND 10 TO CLAIM 1 CANNOT, BY DEFINITION, RAISE NEW
ISSUES, SINCE CLAIMS 9 AND 10 WERE DEPENDENT ON CLAIM 1.

If an extension of time for this paper is required, petition for extension is herewith made. Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,


For Applicants
YC:cgm

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